

A Fisheries Survey of Troy-Cedar Lake, Whitley County, Indiana, June 2004

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INTRODUCTION

Troy-Cedar Lake, located in Whitley County, Indiana, is a deep lake with a maximum depth of 88 ft (Figure 1). Access to this lake is limited to a privately owned boat ramp. This lake was previously sampled in 1981 to evaluate complaints from anglers regarding a minor fish kill and poor angling (Braun 1981). Due to heavy rain and an influx of sediment from surrounding agricultural fields, the water quality in the lake decreased and adequate oxygen levels were not present below 10 ft in depth. In 1982, a follow-up survey was conducted to evaluate changes in the water quality and game fish population (Braun 1982). During that survey, the fishery appeared to be recovering from the poor water quality in 1981. The general survey in 2004 was conducted to determine changes that may have occurred in this lake since the 1982 survey.

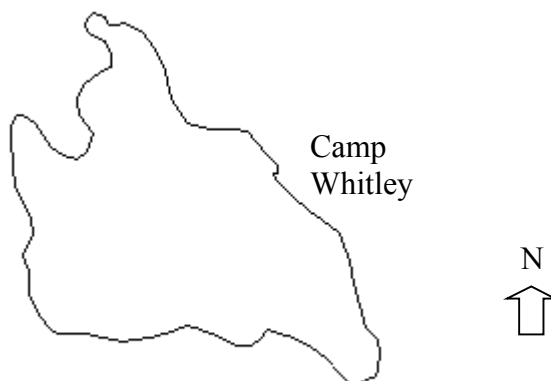


Figure 1. Troy-Cedar Lake located in Whitley County, Indiana.

RESULTS

A total of 560 fish consisting of 12 species were captured from gill nets and trap nets set overnight, as well as night boat electrofishing in Troy-Cedar Lake (Table 1). The total weight of all captured fish was 339.51 lbs. The most abundant fish species in the lake were bluegill, gizzard shad, largemouth bass, and spotted gar. The least abundant fish in this system were golden shiner, white sucker, brown bullhead, spotted sucker, warmouth, common carp, yellow perch, and black crappie.

Bluegill was the most abundant species captured and comprised 45.9% of the total catch ($N = 257$). These fish ranged in size from 1.7 to 8.5 in and had a batch weight of

Table 1. Amount of effort and relative abundance of fish species collected from Troy-Cedar Lake, Whitley County, Indiana, in June 2004.

Species	2004	1982	1981	1964
Bluegill	257	73	29	338
Gizzard shad	133	76	20	7
Largemouth bass	95	33	76	156
White sucker	2	63	32	8
Channel catfish	-	1	3	-
Black crappie	5	39	3	11
Common carp	9	3	2	1
Longear sunfish	-	1	-	15
Spotted sucker	2	-	1	-
Yellow bullhead	-	3	5	17
Yellow perch	10	52	69	62
Quillback	-	1	-	-
Green sunfish	-	-	2	-
Redear sunfish	-	-	-	76
Pumpkinseed	-	-	1	109
Warmouth	3	-	1	65
Spotted gar	39	16	30	11
Golden shiner	2	35	151	10
Lake chubsucker	-	8	8	9
Grass pickerel	-	1	3	4
Northern pike	-	-	-	1
Longnose gar	-	-	-	1
Brown bullhead	3	20	10	1
Bowfin	-	3	1	1
Black bullhead	-	-	2	-
Madtom sp.	-	-	2	-
Total	560	428	451	903
Effort	2004	1982	1981	1964
Electrofishing hrs	1.0	0.57	1.6	5.0*
Trap net lifts	3	5.5	9	-
Gill net lifts	4	5.5	9	28
Wire trap lifts	-	-	-	105

*AC Electrofishing

40.05 lbs (11.8% of total weight). Captured bluegills were ages 1+ through 7+ and growth was slightly below average. The PSD was 48.7 and the RSD-8 was 4.7.

Gizzard shad were the second most abundant species by catch (N = 133) and represented 23.8% of the total number of fish captured during the survey. In addition,

this species was second in abundance by weight with 65.97 lbs (19.4%). These fish ranged in length from 5.6 to 14.1 in.

Largemouth bass (length range, 4.5 to 20.5 in) were third in abundance based on total catch (N = 95; 17.0%). However, this species comprised the largest percentage of weight (95.82 lbs; 28.2%) overall. The largemouth bass in this lake were ages 1+ to 11+. No age-10 largemouth bass (year-class 1994) were captured. Growth was above average and PSD was 47.7. The RSD-14 was 29.5 and the RSD-18 was 4.5.

Spotted gar (N = 39) was the fourth most abundant species based on total catch (7.0%). This species was also the fourth most abundant based on percent weight and comprised 16.7% of the total weight captured from the lake (56.58 lbs). These fish ranged in length from 18.5 to 30.0 in.

Common carp made up only 1.6% of the total catch (N = 9). However, these fish were third in abundance based on weight at 18.3% (62.20 lbs). These fish ranged in size from 21.6 to 27.6 in.

Water quality was determined for Troy-Cedar Lake. Surface dissolved oxygen (DO) was 7.9 mg/L, however, adequate oxygen levels for fish were not present below 12 ft. The color of the water was green and the secchi disk reading was 5 ft, 1 in.

Vegetation sampling resulted in the identification of 15 different species of submersed, emergent, floating, and shoreline plants, including Eurasian water milfoil, *Vallisneria* (eel grass), sago pondweed, large-leaf pondweed, long-leaf pondweed, coontail, spatterdock, softstem bulrush, duckweed, water plantain, cattails, white water lily, yellow pond lily, pickerelweed, and water willow. Coontail and Eurasian watermilfoil were the most dominant submersed vegetation in the sampled area. The dominant algae found during this survey was pithophora.

SUMMARY

The fish population structure in Troy-Cedar Lake has only slightly changed since this lake was last surveyed in 1982. In 2004, bluegill, gizzard shad, and largemouth bass dominated the community, unlike 1982 when bluegill, gizzard shad, and white sucker were the most abundant species in the lake. This may be a positive result of the size limit set for largemouth bass. Bluegill growth is slightly below average, however, large bluegill are available in the lake. Slow growth of these fish may be a result of

competition with gizzard shad for available forage. In addition, there were more and larger largemouth bass captured in 2004 than in 1982, exhibiting above average growth and indicating that this fishery is healthy. A greater number of gizzard shad were also collected in 2004 than in 1982, so predators such as largemouth bass may not be able to prey on gizzard shad adequately enough to keep the population level low. Yellow perch, black crappie, and white suckers are still found in this lake, however, in 2004 only a few of each species were captured compared to the large numbers collected in 1982. In addition, few carp were captured in 2004, similar to the 1982 survey. However, there is room for improvement. This 93-acre lake has a watershed that is primarily agricultural and the sediment and nutrient input over the years has decreased lake depth, promoting nuisance levels of aquatic vegetation and decreased water clarity. As a result, sight-feeding species such as largemouth bass, bluegill, black crappie, and yellow perch are at a disadvantage.

RECOMMENDATIONS

Because of the limited access to Troy-Cedar Lake, general fisheries surveys should only be conducted on this lake in order to evaluate evident changes that occur in the fishery, such as a fish kill or poor fishing. The water quality in the lake at the time of the 2004 survey was adequate for fish survival. Because of the healthy largemouth bass fishery, a public access site on this lake would make this resource available to a greater number of anglers. In addition, lake and watershed residents are encouraged to participate in the LARE (Lake and River Enhancement) program (Division of Soil Conservation) and USDA Farm Bill.

LITERATURE CITED

- Braun, E. R. 1981. Troy-Cedar Lake, Whitley County Fish Management Report. Indiana Department of Natural Resources, Indianapolis, Indiana.
- Braun, E. R. 1982. Troy-Cedar Lake, Whitley County Fish Management Report. Indiana Department of Natural Resources, Indianapolis, Indiana.

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APPENDIX 1

Lake Survey Report and Relative Abundance of Fish Species by Number and Weight

LAKE SURVEY REPORT

Type of Survey	<input type="checkbox"/> Initial Survey	<input checked="" type="checkbox"/> Re-Survey
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Lake Name	County	Date of survey (Month, day, year)
Troy-Cedar Lake	Whitley	June 7-8, 2004
Biologist's name	Date of approval (Month, day, year)	
Edward R. Braun		

LOCATION		
Quadrangle Name	Range	Section
Lorane	8E	10, 11
Township Name	Nearest Town	
32N	Columbia City, IN	

ACCESSIBILITY					
State owned public access site		Privately owned public access site		Other access site	
None		Southeast corner		None	
Surface acres	Maximum depth	Average depth	Acre feet	Water level	Extreme fluctuations
93	88	27.4	2,545	905.41	2 feet
Location of benchmark					

INLETS		
Name	Location	Origin
Doland Drain	North	Mud, Scott Lakes
Unnamed	Southeast	Little Cedar Lake
Unnamed	North	Runoff

OUTLETS			
Name	Location		
Cedar Creek	West to Tippecanoe River		
Water level control			
Concrete dam with removable boards			
POOL	ELEVATION (Feet MSL)	ACRES	Bottom type
TOP OF DAM			<input type="checkbox"/> Bolder
TOP OF FLOOD CONTROL POOL			<input checked="" type="checkbox"/> Gravel
TOP OF CONSERVATION POOL			<input checked="" type="checkbox"/> Sand
TOP OF MINIMUM POOL			<input checked="" type="checkbox"/> Muck
STREAMBED			<input type="checkbox"/> Clay
			<input type="checkbox"/> Marl

Watershed use
Primarily agricultural
Development of shoreline
Camp Whitley on east shore. East and South shores residentially developed. North and west shores undeveloped.
Previous surveys and investigations
Lake mapping, U.S.G.S., 1956; Fisheries surveys, IDNR, 1964, 1981, 1982.

SPECIES AND RELATIVE ABUNDANCE OF FISHES COLLECTED BY NUMBER AND WEIGHT					
*COMMON NAME OF FISH	NUMBER	PERCENT	LENGTH RANGE (inches)	WEIGHT (pounds)	PERCENT
Bluegill	257	45.9	1.7-8.5	40.05	11.8
Gizzard shad	133	23.8	5.6-14.1	65.97	19.4
Largemouth bass	95	17.0	4.5-20.5	95.82	28.2
Spotted gar	39	7.0	18.5-30.0	56.58	16.7
Yellow perch	10	1.8	8.3-12.1	4.12	1.2
Common carp	9	1.6	21.6-27.6	62.20	18.3
Black crappie	5	0.9	3.6-7.5	0.69	0.2
Brown bullhead	3	0.5	13.5-14.0	3.99	1.2
Warmouth	3	0.5	5.9-8.0	1.01	0.3
Spotted sucker	2	0.4	16.0-17.4	4.25	1.3
Golden shiner	2	0.4	7.3-8.6	0.38	0.1
White sucker	2	0.4	16.5-17.2	4.45	1.3
Total (12 Species)	560	100.0		339.51	100.0
*Common names of fishes recognized by the American Fisheries Society.					

APPENDIX 2
Sampling Effort and Water Quality Parameters

SAMPLING EFFORT					
ELECTROFISHING	Day hours		Night hours		Total hours
	0		1		1
TRAP NETS	Number of traps		Number of Lifts		Total effort
	3		1		3
GILL NETS	Number of nets		Number of Lifts		Total effort
	4		1		4
ROTENONE	Gallons	ppm	Acre Feet Treated	SHORELINE SEINING	Number of 100 Foot Seine Hauls

PHYSICAL AND CHEMICAL CHARACTERISTICS			
Color	Turbidity		Air temperature: 79 F
Green	5 Feet	1 Inches (SECCHI DISK)	
Water chemistry GPS coordinates:		N	W

WATER QUALITY PARAMETERS															
DEPTH (Feet)	Degrees (F)	D.O.	SpC	pH	TDS	D.O.%	Turb.	DEPTH	Degrees (F)	D.O.	SpC	pH	TDS	D.O.%	Turb.
SURFACE	72.1	7.9	0.48			91.0	6.6	52	42.4	0.2	0.52			1.8	2.5
2	71.9	7.8	0.48			89.8	6.6	54	42.2	0.0	0.52			0.0	2.7
4	71.6	7.6	0.48			87.4	7.0	56	41.9	0.0	0.53			0.0	2.3
6	71.4	7.4	0.49			84.8	6.6	58	41.8	0.0	0.53			0.0	2.0
8	68.9	4.8	0.49			54.2	1.9	60	41.7	0.0	0.53			0.0	2.1
10	67.8	3.9	0.49			42.6	1.4	62	41.7	0.0	0.53			0.0	2.1
12	67.0	3.0	0.49			32.3	1.7	64	41.6	0.0	0.53			0.0	2.5
14	65.9	2.6	0.49			27.6	2.0	66	41.5	0.0	0.53			0.0	2.1
16	64.0	2.1	0.50			21.9	3.1	68	41.5	0.0	0.53			0.0	2.2
18	61.1	1.6	0.52			15.9	5.1	70	41.5	0.0	0.53			0.0	2.2
20	57.2	1.8	0.53			17.0	8.9	72	41.5	0.0	0.53			0.0	2.2
22	55.7	1.0	0.53			9.7	8.3	74	41.5	0.0	0.53			0.0	1.7
24	55.2	0.4	0.53			4.1	6.9	76	41.4	0.0	0.53			0.0	34.6
26	54.9	0.1	0.53			0.6	4.9	78	41.4	0.0	0.55			0.0	0.0
28	54.6	0.0	0.53			0.0	4.7	80							
30	54.1	0.0	0.53			0.0	4.9	82							
32	52.9	0.3	0.52			2.3	5.3	84							
34	51.1	0.5	0.53			4.1	4.9	86							
36	49.7	0.8	0.52			7.1	3.7	88							
38	47.9	1.2	0.53			10.6	4.5	90							
40	46.1	1.5	0.53			13.2	3.5	92							
42	44.0	1.5	0.52			11.9	3.4	94							
44	43.6	1.2	0.52			9.9	2.3	96							
46	43.3	1.0	0.52			8.3	2.2	98							
48	43.0	0.6	0.52			5.2	3.0	100							
50	42.8	0.5	0.52			4.1	2.4								

APPENDIX 3

Length Ranges for Bluegill and Largemouth Bass for Each Gear Type:

Gill Nets (GN), Electrofishing (EF), and Trap Nets (TN)

Back-Calculated Lengths at Each Age for Bluegill and Largemouth Bass

Body of water: Troy-Cedar Lake

Date: 6/7-8/2004

Species: Bluegill

PSD: 48.7

CPUE:

Gill nets: 4.3 fish/lift

Electrofishing: 236 fish/h

Trap nets: 1.3 fish/lift

	GN	EF	TN	Total
SS ^a	17	234	4	255
QS ^b	13	114	1	128
PS ^c	2	7	0	9
MS ^d	0	0	0	0
TS ^e	0	0	0	0
HS ^f	13	125	1	139
Total	17	236	4	257

^aSS = stock size^bQS = quality size^cPS = preferred size^dMS = memorable size^eTS = trophy size^fHS = harvest size

Length	GN	EF	TN	Total	Ave. Wt.	Age
1.5	0	1	0	1	0.00	1+
2.0	0	1	0	1	0.00	1+
3.0	0	1	0	1	0.01	1+, 2+
3.5	0	5	1	6	0.03	2+
4.0	0	12	1	13	0.03	2+, 3+
4.5	0	23	0	23	0.06	3+
5.0	3	39	1	43	0.08	3+
5.5	1	29	0	30	0.10	3+, 4+
6.0	2	22	0	24	0.15	3+, 4+, 5+
6.5	5	47	1	53	0.20	4+, 5+
7.0	4	33	0	37	0.24	4+, 5+
7.5	0	12	0	12	0.32	5+, 6+
8.0	1	10	0	11	0.37	5+, 6+, 7+
8.5	1	1	0	2	0.43	6+, 7+

Body of water: Troy-Cedar Lake
 Date: 6/7-8/2004
 Species: Largemouth bass
 PSD: 47.7

CPUE:
 Gill nets: 1 fish/h
 Electrofishing: 91 fish/h
 Trap nets: 0 fish/h

	GN	EF	TN	Total	
SS ^a	4	88	0	92	^a SS = stock size
QS ^b	2	42	0	44	^b QS = quality size
PS ^c	1	13	0	14	^c PS = preferred size
MS ^d	0	2	0	2	^d MS = memorable size
TS ^e	0	0	0	0	^e TS = trophy size
HS ^f	1	26	0	27	^f HS = harvest size
Total	4	91	0	95	

Length	GN	EF	TN	Total	Avg. Wt. (lbs)	Age
4.5	0	1	0	1	0.04	1+
7.5	0	1	0	1	0.17	2+
8.0	0	1	0	1	0.20	2+
9.5	0	5	0	5	0.38	2+, 3+
10.0	0	6	0	6	0.43	3+
10.5	1	11	0	12	0.49	3+, 4+
11.0	0	11	0	11	0.57	3+, 4+
11.5	0	11	0	11	0.67	4+
12.0	1	3	0	4	0.79	4+
12.5	0	7	0	7	0.91	4+
13.0	0	4	0	4	0.99	4+
13.5	1	4	0	5	1.07	4+
14.0	0	6	0	6	1.20	4+
14.5	0	4	0	4	1.36	4+, 5+
15.0	0	5	0	5	1.46	4+, 5+
15.5	1	5	0	6	1.88	4+, 5+, 6+
16.0	0	1	0	1	2.09	5+, 6+, 7+
17.0	0	1	0	1	2.86	7+, 8+
19.0	0	1	0	1	3.46	8+
19.5	0	1	0	1	3.82	8+
20.5	0	2	0	2	4.61	9+, 11+